Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
Advanced Television Systems and Their Impact on the Existing Broadcasting Service	)	MM Docket No. 87-268

COMMENTS OF
THE CENTER FOR ADVANCED TELEVISION STUDIES

1. Executive Summary

A brief description is given of the origin, purposes, and program of the Center for Advanced Television Studies (CATS). The various advanced television (ATV) systems under development by CATS and others are analyzed from the standpoint of the appropriate studio production system to be used in practice and for the purpose of testing. The analysis is carried out under the guidelines of the recent Tentative Decision and Further Notice of Inquiry.

We believe that the selection of a transmission system should be made on the basis of system quality as well as optimum transmission parameters rather than on existing or new studio production standards. In view of the necessity for ATV systems intended for use in the United States to be compatible with NTSC or to be easily transcodable to NTSC, the studio production scanning standards to be used with these systems, or to be used to test these systems, should preferably bear a simple relationship to the scanning parameters of NTSC. To the extent that it is

practical it would be desirable to use source and display standards appropriate for each ATV system being tested.

CATS recommends that adequate time be allowed for test of proponent systems before a selection is made. CATS believes that premature selection of a transmission standard and accompanying spectrum assignments by the Commission may prevent exploitation of beneficial possibilities.

2. The Center for Advanced Television Studies

The Center for Advanced Television Studies (CATS) is an organization of companies directly involved in or closely related to the TV industry. CATS sponsors research and development in the field. At the present time, each member has a 3-year contract with MIT, in the amount of $100,000 per year, which funds MIT's Advanced Television Research Program. The Public Broadcasting Service (PBS), which does not make a monetary contribution, acts as a secretariat for CATS. The program has Justice Department approval under the anti-trust laws.

The first contract ran for three years from June 1, 1983. The original sponsors (all CATS members) were ABC, NBC, Time, Inc. (Home Box Office/ATC), PBS, Ampex, Tektronix, RCA, Harris, 3-M, and CBS, of which all but the last three renewed in 1986. Zenith joined on June 1, 1986, Eastman Kodak on January 1, 1987, and General Instrument on October 14, 1988. The NBC Affiliates

Organization are in the process of joining. The MIT program has had additional funding since December 1987 from HBO for the development of a system for cable. The primary R & D goal of the program at present is to study, analyze and develop improved television systems. A further goal is to encourage and support undergraduate and graduate study for research engineers in the field of television systems and technology. After several years of study and research, a family of new systems and concepts are now under development.

3. Significance of FCC Decision for Production Standards

In the Tentative Decision and Further Notice of Inquiry (FNOI), the Commission has ruled that initial ATV broadcasts either be NTSC-compatible or be NTSC-simulcast. The MIT systems described below and other ATV transmissions systems submitted to the Systems Sub-committee Working Party 1 such as the Advanced Compatible Television System (ACTV), proposed by the David Sarnoff Research Center, the ATV systems proposed by the Broadcast Technology Association (BTA) of Japan, Faroudja Laboratories, North American Philips, the New York Institute of Technology, Zenith Electronics Corporation and the Del Rey Group, are examples of systems that would be favored by the use of a production standard using scanning parameters related to NTSC frame/field rate. It is also noteworthy that use of progressively scanned source material produces the highest quality results.

While implementation of the Commission Tentative Decision would be eased by simple transcoding between the HDTV production standard and the ATV broadcast format, we believe the Commission should choose a transmission standard based on optimum transmission parameters rather than on existing or new production standards. In principle, any production standard can be transcoded with good quality to any transmission standard. In actual practice, the complexity and quality of transcoding depends very much on the relationship between the formats. As a consequence it ultimately may be desirable to adjust existing or new production standards to that which is optimum for the chosen transmission standard.

4. ATV Systems Under Development at MIT.

MIT-RC is a one-channel (6-MHz) receiver-compatible enhanced-definition (EDTV) system featuring improved resolution on special receivers, satisfactory reception on existing receivers, freedom from NTSC cross-effects, and in one form, digital audio. Another version of this system uses a 3-MHz low-power enhancement signal (which can be transmitted in a taboo channel) for improved performance. MIT-RC will work best with a 59.94 Hz. field/frame rate progressively scanned production standard. MIT-CC is a one channel (6-MHz) noncompatible system with resolution and digital audio/data capabilities comparable to Japanese HDTV transmission systems but on special receivers only. It is being developed specifically for cable use under the HBO contract, but it is also applicable to an eventual noncompatible broadcasting system

perhaps in the taboo channels. In that application, it also features reliable performance in degraded channels with means of suppressing ghosts, random noise, and mutual interference between TV transmissions. Both systems are fully compatible with terrestrial, satellite , and cable channels and can achieve higher performance should additional spectrum be made available, either in contiguous or noncontiguous bands.

We believe the work described here represents significant advancement in the understanding and practice of advanced television concepts and techniques and CATS is justly proud of its support of this work. The reduction in the effects of multipath and of mutual interference between video modulated signals, the possibility of elimination of taboo channels and the improvement in signal-to-noise in degraded channels, are some of the desirable potential developments for ATV which this work suggests. CATS believes that premature selection of a transmission standard and accompanying spectrum assignments by the Commission may prevent exploitation of these beneficial possibilities.

5. Testing of Candidate Systems

It seems to us entirely reasonable that transmission systems be tested with the type of production system likely to be used in practice. All of the proposed ATV systems that adhere to the introduction scenario established by the FNOI must be transcodable to NTSC, and would therefore give best performance at lowest cost

with a 59.94-Hz field/frame rate production standard. In keeping with the improvements realizable through motion compensation, the production system would preferably be progressively scanned.

6. Conclusion

CATS members are actively sponsoring the development of ATV systems, and in addition, have carefully analyzed all of the proposed systems under development by others. Our conclusion is that, in view of the necessity for ATV systems intended for use in the United States to be compatible with NTSC or to be easily transcodable to NTSC, a production system to be used with these systems, or to be used to test these systems, should bear a simple relationship to the scanning parameters of NTSC. We also believe that the selection of a transmission system should be made on the basis of system quality as well as optimization of transmission parameters and that adequate time be allowed for test of proponent system before a selection is made.

Respectfully submitted,

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